a CF-End frame. An exemplary typical scenario is that the main lobe **220** is moving from azimuth **1620-1** toward the coverage area **1650** formed by the AP **230** and toward azimuth **1620-2** such that there should be no contention allowed for STAs **240** in time period **1610**, and the AP **230** can indicate such via the second (2^{nd}) CF-End frame. However, the radar finds a target, T, **1640** and in a tracking mode stays at azimuth **1620-1**. This means that there may be contention allowed in time period **1610**, prior to the second Beacon frame **1605-2**. The AP **230** could modify the second CF-End frame to allow contention, e.g., between STAs **2** and **3**.

[0074] Exemplary embodiments herein solve the problem posed above with modifications in the CF-End frame indication and also protocol changes in medium access due to this coexistence. Additionally, an exemplary improved channel access mechanism is disclosed using EDCA for Wi-Fi systems operating in the same channel as that of an operating radar for reduced interference from the latter.

[0075] More particularly the following exemplary and non-limiting concepts are introduced in exemplary embodiments herein.

[0076] 1. Within the CF-End frame, the Duration field is redefined with respect to the next scheduled NDP CTS frame. Furthermore, it is proposed to include a one bit indication termed as "Channel Release" in NDP CTS to indicate to the STAs that, on receipt of such an NDP CTS frame, none of the STAs are allowed to contend for the rest of the TxOP duration. Alternatively, another proposal is to use a new "quiet" frame with similar information fields as in a CF End frame that an AP may broadcast in case the AP detects a radar mode change.

[0077] 2. Another exemplary proposal is a set of rules for STAs that either wake up before or at the time of a CF-End frame transmission.

[0078] 3. An additional exemplary proposal is to define a set of rules for STAs that wake up after the CF-End frame transmission.

[0079] These examples are described in more detail below. An introductory description of radar operation with respect to the exemplary embodiments is now described.

[0080] In case of search and track radars, e.g., TPQ-37, a radar transmits a predefined set of pulses to indicate mode switch, i.e., from search to track or from track to search mode. These set of pulses have a pre-defined duty cycle and are different from the set of pulses with characteristic duty cycle used for searching and tracking. The APs **230** operating co-channel will detect these predefined set of pulses and understand a mode switch operation at the radar. During the mode switch, the STAs and the AP may be in between an NDP CTS frame interval. Hence, the AP sends either a CF-End frame or a new "quiet" frame to transmit this mode change information to STAs to prevent STAs from further transmissions and therefore quiet the BSS.

[0081] Now that an introductory description of radar operation has been described, concerning the scenario when radar and Wi-Fi operate concurrently within TxOP, the following are suggested. It is proposed to modify the existing CF-End frame **700** as depicted in FIG. **7**. The fields in CF-End frame **700** are described in, e.g., IEEE P802.11-REVmcTM/D1.6, September 2013, IEEE P802.11-REVmcTM/D1.6, September 2013, Draft Standard for Information technology—Telecommunications and information exchange between systems, Local and metropolitan area networks—Specific requirements, Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications. A MAC header includes the "Frame Control" field **705**, the "Duration" field **720**, the "RA" field, and the "BSSID(TA)" field. In order to alleviate the problem of STAs still contending when the BSS is aligned with the main lobe **220** of the radar signal, it is proposed to replace the "More Fragments" subfield, which is a subfield of the "Frame Control" field **705**, with a "Release Channel" subfield **710**. The More Fragments subfield is 1 (one) bit in length and is set to 1 (one) in all Data or Management frames that have another fragment of the current MSDU or current MMPDU to follow. The More Fragments subfield is set to 0 (zero) in all other frames. In the example of FIG. **7**, the "Release Channel" subfield takes the place of the "More Fragments" subfield. The "Release Channel" subfield **710** may be interpreted as follows:

[0082] (i) If the "Release Channel" subfield **710** is set to 0 (zero), the "Duration" field is not indicated in the MAC frame header; STAs behave as defined in a current 802.11 Standard, i.e., reset their NAV and contend for the channel immediately.

[0083] (ii) If the "Release Channel" subfield **710** is set to 1 (one) and the "Duration" field **720** is set to 0 (zero), this combination implies that STAs **240** need to release the channel immediately; and

[0084] (iii) If the "Release Channel" subfield is set to 1 (one) and the "Duration" field **720** is set to a non-zero value, this combination implies that STAs need to release the channel at a time indicated in the Duration field. The value of the Duration field could be set, e.g., to tens of milliseconds. The STAs perform virtual carrier sensing using NAV (Network Allocation Vector). On decoding the Duration field, the NAV counter is set to the value indicated in the Duration field. When the NAV counter time goes down to 0 (zero), the STAs start contending for the channel

[0085] Moreover, as depicted in FIG. **3**, the Duration field in the NDP CTS frame **300** indicates a value corresponding to the remaining time from the transmission of CF-End frame to the next scheduled NDP CTS frame. The Duration field **720** is similar but in the CF-End frame **700**.

[0086] During the TxOP time (e.g., **1607** in FIG. **6**), the AP **230** still monitors the radar beam position from the radar database. If the AP detects that the main lobe is still aligned with the BSS, it may transmit a CF-End frame in response to a frame transmitted by a STA within TxOP, instead of an ACK frame.

[0087] STAs (with current TxOP and others with NAV set) on receipt of the CF-End frame, will decode the "Frame Control" field **705** with the corresponding "Release Channel" subfield **710**. As opposed to the current behavior of STAs, where STAs reset their NAV and contend for the channel, with the "Release Channel" bit set to 1 (one), STAs set their NAV for a duration specified in the "Duration" field **720** of the CF-End frame **700**.

[0088] Concerning the scenario when the radar main beam **220** is not aligned with Wi-Fi BSS and the STAs wake up before or at CF-End transmission, the following examples are presented. In this scenario, in case that the AP detects no interference from the radar operation, the AP **230** may allow the STA **240** which gained the TxOP to complete its transmissions. Once completed and the STA sends a CF-End frame, the AP computes the remaining time to the next scheduled NDP CTS frame transmission. As is known, the IEEE 802.11 family of standards describe the DCF protocol, which controls access to the physical medium. A station must sense the status of the wireless medium before transmitting. If the station finds that the wireless medium is continuously idle for